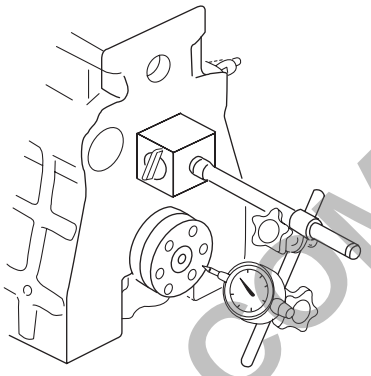
Point 4 Journal bearing cap

Disassemble :

- Before removing the journal bearing, measure the crankshaft side gap. Measure it in either method because there are the next two methods.

[1] Install a dial gage on the cylinder block, and move a crankshaft in front and back, and measure the side gap as shown in the right figure.

[2] Put a thickness gauge in the clearance between thrust metal and crankshaft directly, and measure it.

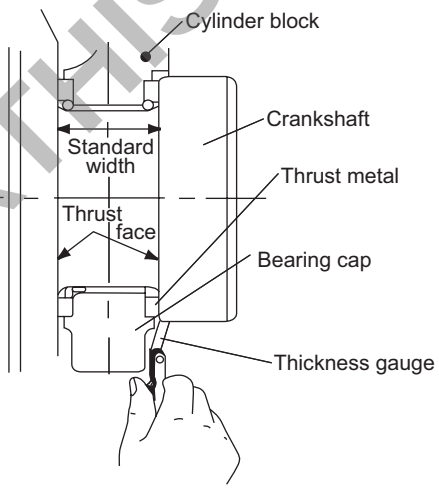


Side gap measurement 1

Side gap standard

in. (mm)

Model	Standard	Limit
All models	0.0051 to 0.0091 (0.13 to 0.23)	0.0110 (0.28)



Side gap measurement 2

Reassemble :

- If the side gap exceeds the standard, replace the thrust metal with an oversize one.
  Machine the standard width of the crankshaft thrust part into the dimension of the below table at the same time.
  Refer to a parts catalog when ordering the part.

  The surface finishing precision (refer to 4.4.5(2) in Chapter4): 1.6

0.0098 in. (0.25 mm) Oversized thrust metal (0.25 DS)

in. (mm)

Thrust metal assy code	Standard thickness
129150-02940	0.0809 to 0.0829 (2.055 to 2.105)

The standard width of the crankshaft thrust part

in. (mm)

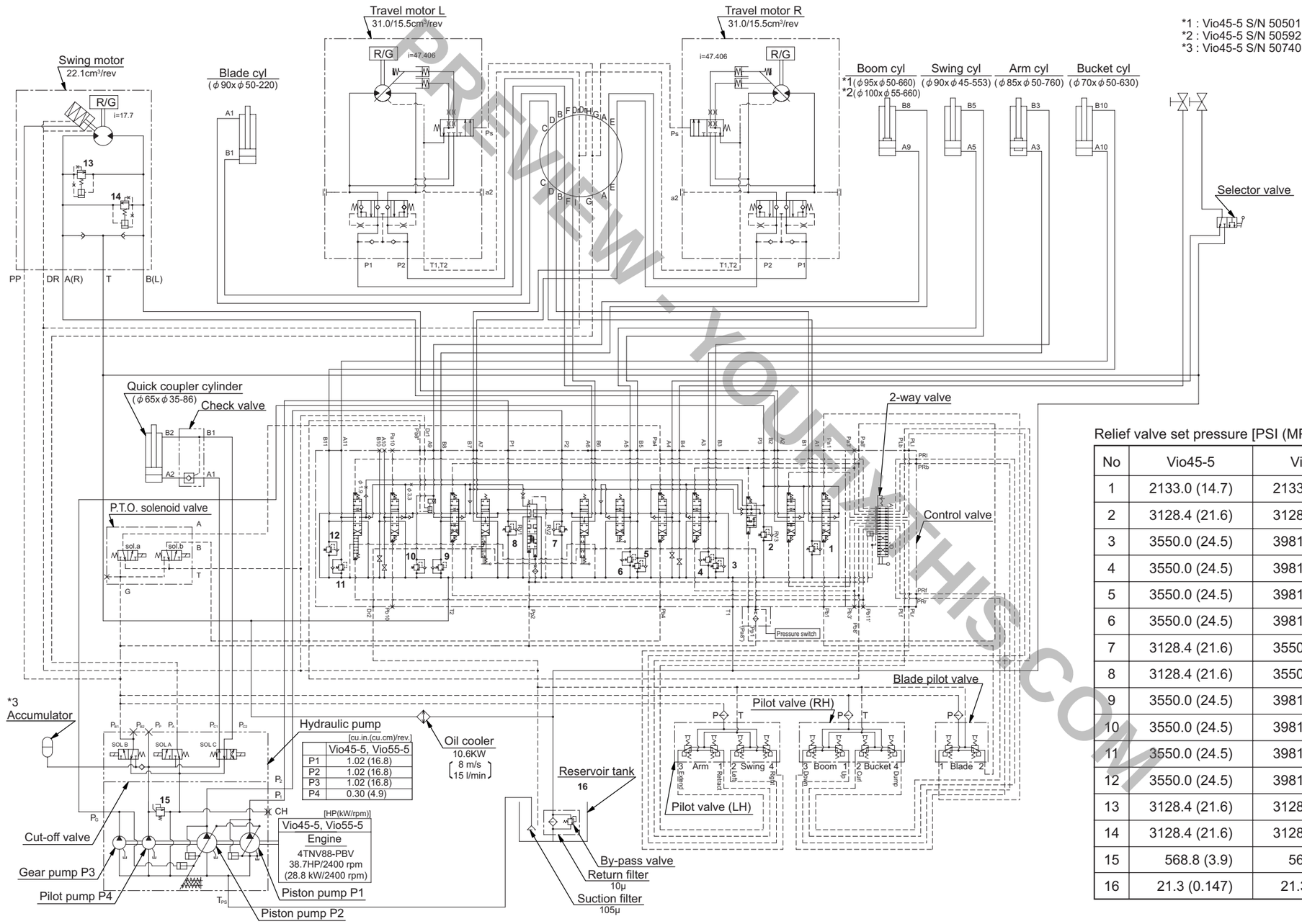
Model	Standard thickness
3TNV88	1.1122 to 1.1130 (28.250 to 28.271)

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5-2 Hydraulic Circuit Schematic

Applicable model : ViO45-5, 55-5



[cu.in.(cu.cm)/rev.]

	Vio45-5, Vio55-5
P1	1.02 (16.8)
P2	1.02 (16.8)
P3	1.02 (16.8)
P4	0.30 (4.9)

[HP(kW/rpm)]

Vio45-5, Vio55-5
Engine
4TNV88-PBV
38.7HP/2400 rpm
(28.8 kW/2400 rpm)

*1 : Vio45-5 S/N 50501 to 50591, Vio55-5 S/N 50501 to 50800
*2 : Vio45-5 S/N 50592 and after, Vio55-5 S/N 50801 and after
*3 : Vio45-5 S/N 50740 and after, Vio55-5 S/N 51054 and after

Relief valve set pressure [PSI (MPa)]

No	Vio45-5	Vio55-5
1	2133.0 (14.7)	2133.0 (14.7)
2	3128.4 (21.6)	3128.4 (21.6)
3	3550.0 (24.5)	3981.6 (27.5)
4	3550.0 (24.5)	3981.6 (27.5)
5	3550.0 (24.5)	3981.6 (27.5)
6	3550.0 (24.5)	3981.6 (27.5)
7	3128.4 (21.6)	3550.0 (24.5)
8	3128.4 (21.6)	3550.0 (24.5)
9	3550.0 (24.5)	3981.6 (27.5)
10	3550.0 (24.5)	3981.6 (27.5)
11	3550.0 (24.5)	3981.6 (27.5)
12	3550.0 (24.5)	3981.6 (27.5)
13	3128.4 (21.6)	3128.4 (21.6)
14	3128.4 (21.6)	3128.4 (21.6)
15	568.8 (3.9)	568.8 (3.9)
16	21.3 (0.147)	21.3 (0.147)

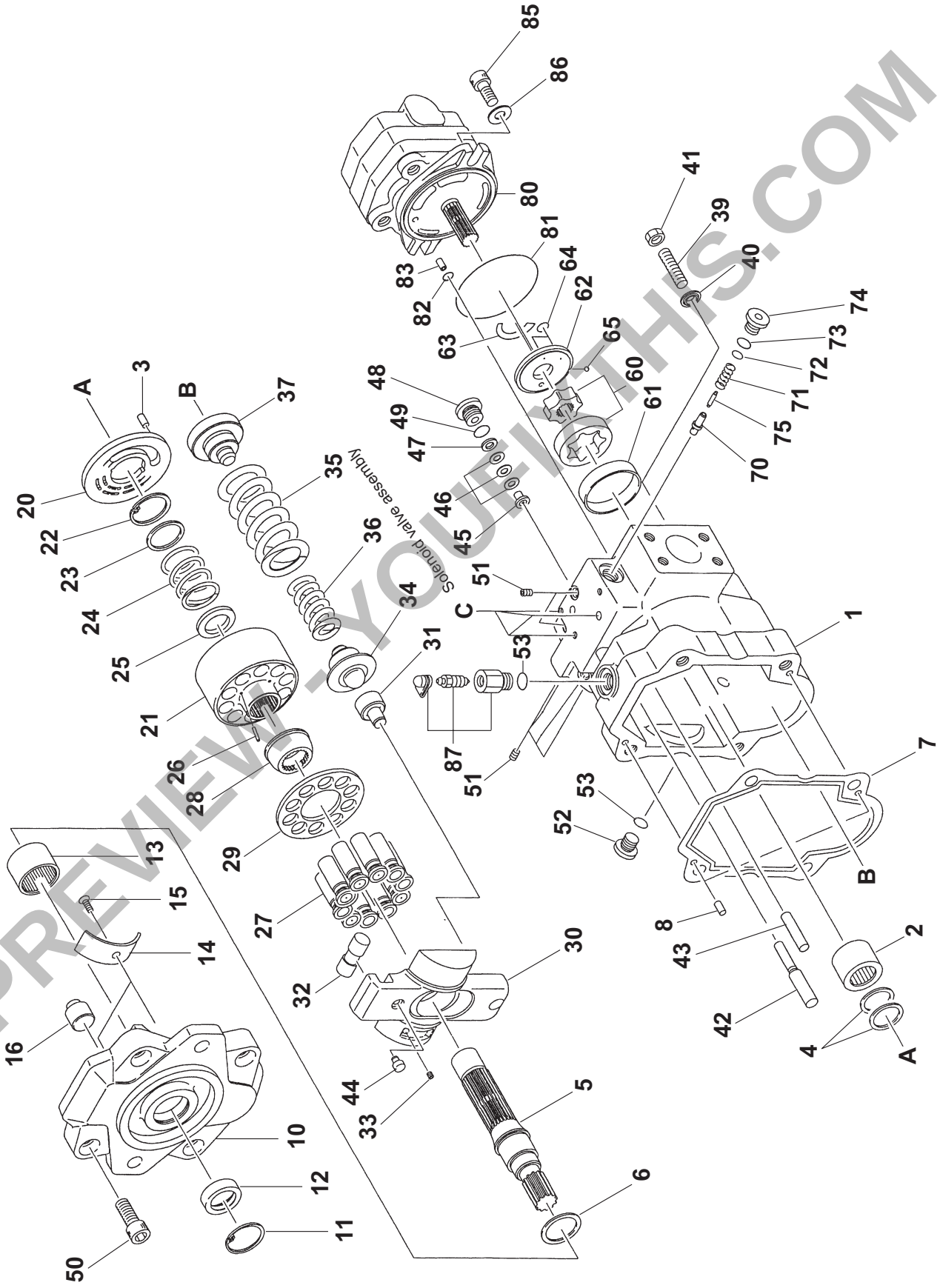
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3. Exploded View and Parts Comprised

1) Hydraulic Pump



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3-7 List of Tightening Torque

3-7-1 Machine

Unit : ft•lbf (N•m)

Applicable model:			ViO45-5, ViO55-5		
Equipment			Thread size	Tightening torque	Adhesive
	No.	Tightening part			
Engine / Electrical equipment					
	1	Engine mount vibroisolating rubber	M16	155.0 to 170.0 (206 to 235)	Three Bond 1324
	2	Engine × Engine mount (Flywheel side)	M10 (10.9T)	47.0 to 54.3 (63.7 to 73.6)	Three Bond 1324
	3	Engine × Engine mount (Radiator side)	M10 (10.9T)	47.0 to 54.3 (63.7 to 73.6)	Three Bond 1324
	4	Hose clip 70 (Air cleaner intake side)	–	0.9 to 1.1 (1.2 to 1.5)	
	5	Hose clip 70 (Intake hose installation)	–	2.2 to 2.9 (2.5 to 3.4)	
	6	Hose clip (Resonator)	–	1.8 to 2.5 (2.5 to 3.4)	
	7	Fuel gauge hose	Hose band 14	0.7 to 1.1 (1.0 to 1.5)	
	8	Fuel gauge unit	Pan head screw M5	0.9 to 1.1 (1.2 to 1.5)	
	9	Fuel tank	M14	86.8 to 108.5 (118 to 147)	Three Bond 1324
	10	Battery holding rod	Nut M8	2.2 (2.9)	Lock nut 9.4 to 12.3 ft•lbf (12.7 to 16.7 N•m)
	11	CW hose clip 41, 48	–	1.8 to 2.5 (2.5 to 3.4)	
	12	Air cleaner	M8	14.5 to 16.6 (19.6 to 22.6)	
	13	Heater hose	Hose clip 22	1.6 to 1.8 (2.2 to 2.5)	
	14	Drain plug	M14	43.0 (59.0)	
	15	Safety switch (2-speed, cut-off)	Lock nut M18 (Fine)	21.7 to 25.3 (29.4 to 34.3)	
Driving system					
	1	Sprocket	M14	137.4 to 151.9 (186.3 to 205.9)	Loctite 262
Travel device					
	1	Plugs (Idler)	R (PT) 1/8	6.5 to 7.2 (8.8 to 9.8)	Loctite 572
	2	Idler seal cover × Track spring	M12	57.9 to 72.3 (78.5 to 98.1)	Three Bond 1324
	3	Track roller tightening nut	Cap nut M16	151.9 to 180.8 (205.9 to 245.2)	Loctite 262
	4	Track guard × Track frame (Steel track spec. only)	M16	123.0 to 151.9 (166.7 to 205.9)	Loctite 262
	5	Track tensioner valve	M16	36.2 (49.0)	

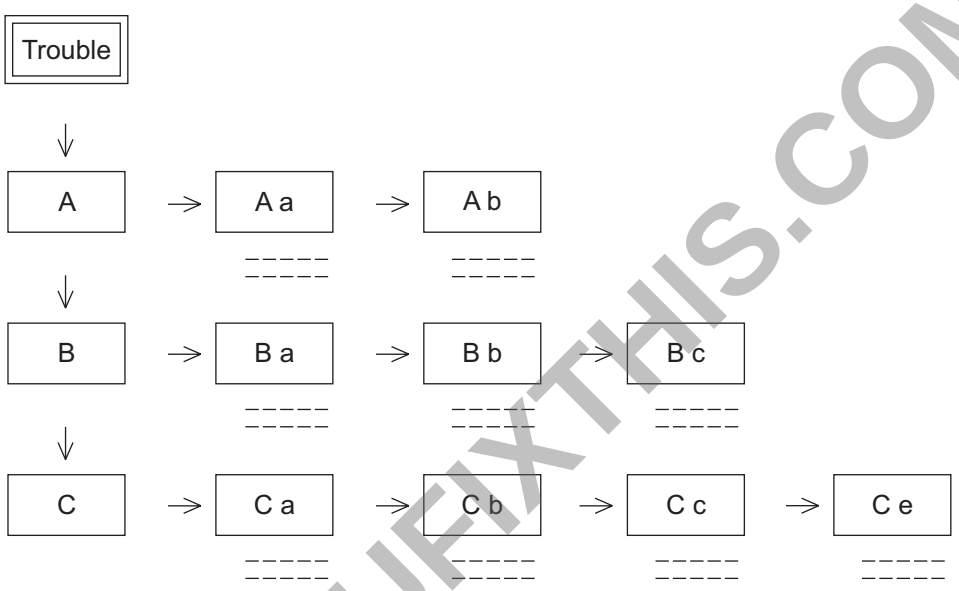
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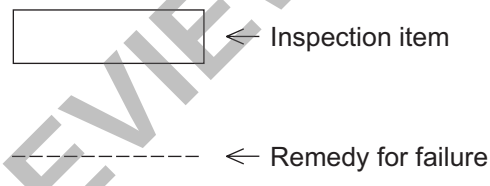
10-2 Troubleshooting

10-2-1 Machine and Engine

(How to use the charts)



Factors related to the trouble are enumerated in the columns and instructions for corrective procedures are given below. It is recommended that the troubles be inspected and corrected one by one according to the chart.



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2. Technical Data

2-1 Specifications

Note : *< > : W/O Quick coupler*

Item				Unit	ViO45-5
Main specifications of machine					
Dimensions					
Overall length (Transportation position)				in. (mm)	207.1 (5260) <202.8 (5150)>
Cabin	Overall height	Transportation position		in. (mm)	103.1 (2620)
		Traveling position		in. (mm)	103.1 (2620)
	Overall width	Full machine width		in. (mm)	77.6 (1970)
Canopy	Overall height	Transportation position		in. (mm)	103.1 (2620)
		Traveling position		in. (mm)	103.1 (2620)
	Overall width	Full machine width		in. (mm)	77.6 (1970)
Tumbler center distance (steel/rubber)				in. (mm)	80.7 (2050)/81.5 (2070)
Track gauge				in. (mm)	65.7 (1670)
Minimum ground clearance				in. (mm)	14.2 (360)
Traveling performance					
Travel speed	Steel track	Low speed (Forward/Reverse)		MPH (km/hr)	1.4 (2.3)
		High speed (Forward/Reverse)		MPH (km/hr)	2.9 (4.6)
	Rubber track	Low speed (Forward/Reverse)		MPH (km/hr)	1.4 (2.3)
		High speed (Forward/Reverse)		MPH (km/hr)	2.9 (4.6)
Permissible water depth limit				in. (mm)	19.7 (500)
Work performance					
Bucket	Width (Standard) *including side cutter			in. (mm)	25.6 (650)
	(Standard. JIS heaped capacity)			cu.ft. (cu.m)	4.94 (0.14) [Old JIS 4.59 (0.13)]
	Number of teeth / Installation method			pcs.	4 / rubber pin lock type
Maximum digging depth	With blade raised			in. (mm)	144.9 (3680) <137.8 (3500)>
	With blade on the ground			in. (mm)	151.6 (3850) <145.7 (3700)>
Maximum depth of vertically digging				in. (mm)	106.3 (2700) <112.2 (2850)>
Maximum dumping height (canopy/cabin)				in. (mm)	153.9 (3910) <157.5 (4000)>
Minimum front swing radius (with boom in front) (canopy/cabin)				in. (mm)	91.3 (2320) <81.1 (2060)>
Minimum front swing radius (at 90 degrees right boom swing)			Cabin	in. (mm)	78.3 (1990) <68.1 (1730)>
			Canopy	in. (mm)	78.3 (1990) <68.1 (1730)>
Rear end swing radius				in. (mm)	38.4 (975)
Boom swing angle		Cabin	Left	degrees	70
			Right	degrees	70
		Canopy	Left	degrees	70
			Right	degrees	70
Maximum digging force		Bucket		lbs. (k•N)	6725 (29.9) <8489 (37.7)>
		Arm		lbs. (k•N)	4631 (20.6) <5292 (23.5)>

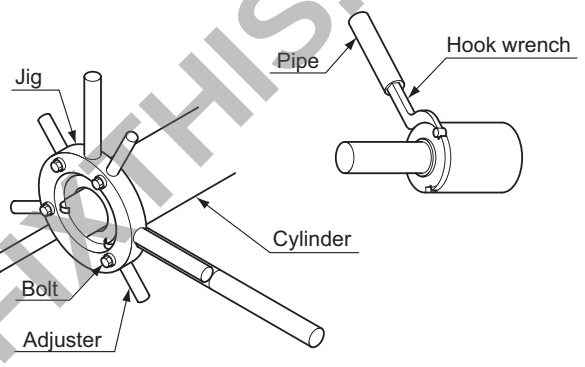
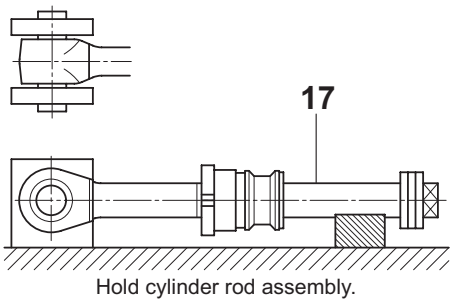
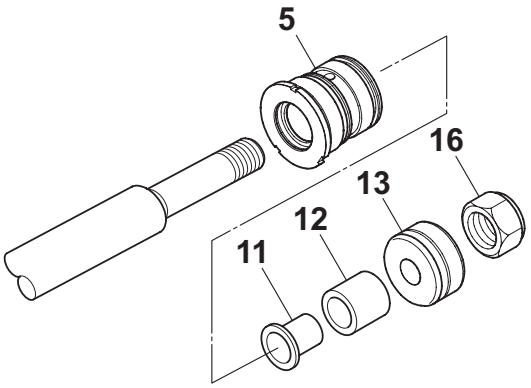
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2) Cautions for Disassembly and Reassembly

(1) Parts are produced so accurately. Be careful not to damage any parts by dropping them or knocking them together.
(2) If there are any burrs on the surface of the seal installation part or the O-ring groove, remove them.
(3) Never use the lock washer removed once.
(4) Replace once removed seals and O-rings with new ones.
(5) Clean all the parts and dry them by air blow.

3) Disassembly

Procedure	
(1) Drain the oil from the hydraulic cylinder. (2) Hold the cylinder in the bottom end or the pin hole on the bottom side, and put the rod side of the cylinder on a block. (3) Raise the pawl of the lock washer **3** on the head 5 to loosen the head **5**. ***Note :*** *Use a hook wrench or a jig to loosen the head **5**.*	
(4) Pull out the rod assembly **17** from the cylinder tube **10**, and then hold the cylinder rod assembly in the rod end or the pin hole on the rod side.	 Hold cylinder rod assembly.
(5) Disassembly of boom cylinder. Remove the U-nut **16**, and then the piston **13**, the cushion collar **11**, the cushion plunger **12** and the head **5** from the rod in order.	

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8. Periodic Inspection and Servicing

8-1 List of Periodic Inspection and Servicing

◇ : Check ○ : Supply ● : Replace □ : Adjust (clean) ■ : Oil & grease

Check & service items			Daily	Every 50	Every 100	Every 250	Every 500	Every 1000 hrs
General	Check falling off, breakage of parts		◇					
	Check loosened bolts & nuts, retighten		◇					
	Check engine condition		◇					
	Clean		□					
Lube oil	*Swing gear case oil	Check, resupply				○		
		Replace			● 1st time			●
	Travel reduction gear oil	Check, resupply				○		
		Replace			● 1st time			●
	*Transmission oil	Check, resupply	◇					
		Replace			● 1st time			●
	*Differential gear oil	Check, resupply			◇			
		Replace			● 1st time			●
Hydraulic system	Hydraulic oil	Check, resupply	◇					
		Replace						●
	Clean suction filter					□ 1st time		□
	Replace return filter					● 1st time	●	
	Check for abnormality of hydraulic pump		◇					
Grease	Check grease-up positions, grease		■					
	Greasing the swing gears and the swing bearings			■				
	Greasing the track gauge change cylinder and the link fulcrum			■				
Undercar-riage	Check, adjust track tension		◇					
	*Check air pressure, wear, flaw in tyres		◇					
Steering equipment	*Check performance, play of steering lever		◇					
	Check performance, play of travel lever		◇					
	*Check performance of speed change lever		◇					
	*Check performance of forward/reverse pedal		◇					
	*Check performance, play of steering wheel		◇					
	*Brake pedal	Stroke	◇					
		Performance	◇					
	*Parking brake	Stroke	◇					
		Performance	◇					
	Check performance of accel. level		◇					
Electric equipment	Check front & work lights, horn		◇					
	Check hourmeter function		◇					
	Check function of change, oil and pilot lamps		◇					
	Check wire breakage, short-circuits, loosened terminals, retighten		◇					
	Check, resupply battery fluid		◇					
	Check specific gravity of electrolyte						□ As required	
	Check function of OK monitor		◇					

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9. REFERENCE DATA

9. Fuel, Lube Oil and Grease Recommended

Item	Recommended Type	Capacity
		ViO45-5 / ViO55-5
Fuel	Diesel light oil (JIS #2 or its equivalent)	16.9 Gals. (64 L)
Engine oil	Engine oil SAE 10 W30 (Class CD)	9.4 Qts. (8.9 L)
Hydraulic oil	Hydraulic oil (VG 56 or its equivalent)	Inside tank 10.0 Gals. (38 L) Other sections 6.9 Gals. (26 L) } 16.9 Gals. (64 L)
Travel reduction Gear oil	Gear oil SAE 90 (GL-4)	1.27 Qts. (1.2 L) each
Idler	Engine oil SAE 30 (Class CC)	0.074 Qts. (0.07 L) each
Track roller		0.159 Qts. (0.15 L) each
Carrier roller	Albania EP-2 (Grease)	3.66 cu. in (60 cu. cm) each
Radiator	Soft water (Drinking water) + antirust and antifreeze	Radiator 6.67 Qts. (6.3 L) Sub-tank 0.43 Qts. (0.4 L) } 7.1 Qts. (6.7 L)
Grease	Multipurpose EP (Extereme pressure) grease Albania EP-2 (Grease)	
Antifreeze	Long-life coolant	

* The numeral for the engine oil shows the total oil quantity when the oil filter is replaced.

Mixture ratio of cooling water and antifreeze

Lowest ambient temperature [°F (°C)]		23 (-5)	14 (-10)	5 (-15)	-4 (-20)	-13 (-25)	-22 (-30)	-31 (-35)	-40 (-40)
ViO45-5 ViO55-5	Antifreeze quantity [Qts. (L)]	1.1 (1.0)	1.8 (1.7)	2.1 (2.0)	2.4 (2.3)	2.9 (2.7)	3.2 (3.0)	3.6 (3.4)	3.9 (3.7)
	Water quantity [Qts. (L)]	6.0 (5.7)	5.3 (5.0)	5.0 (4.7)	4.7 (4.4)	4.2 (4.0)	3.9 (3.7)	3.5 (3.3)	3.2 (3.0)

Note :

At the delivery, water and antifreeze are mixed at the ratio for 5 °F (-15°C) temperature above.

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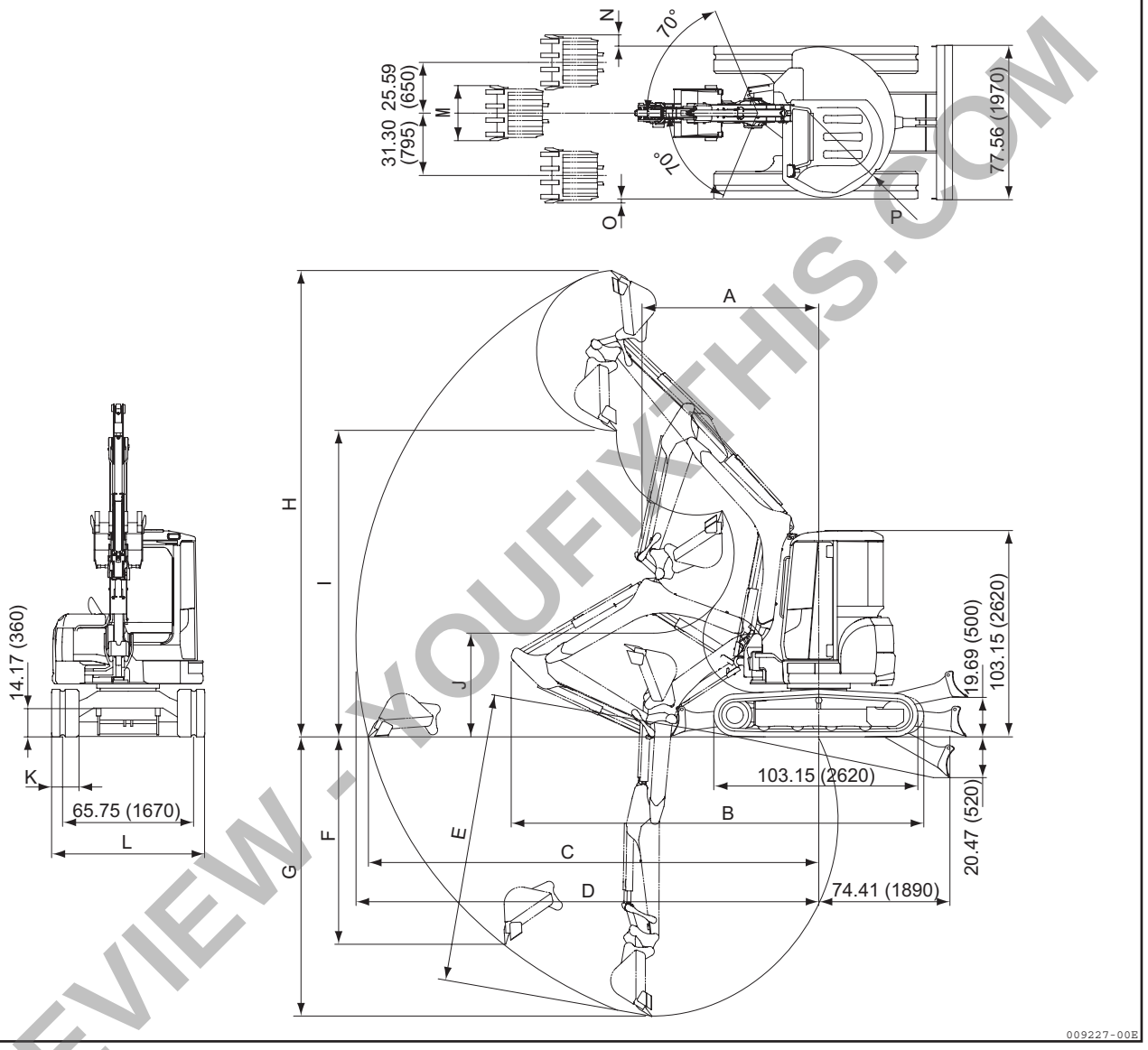
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2-2-2 Cabin type

Unit : in. (mm)



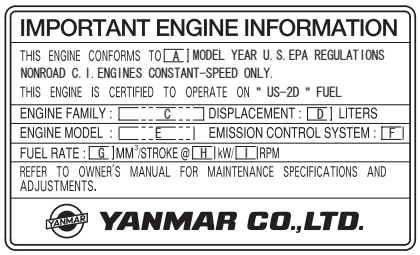
	A <at boom swing>	B	C	D	E	F	G	H	I	J
ViO45-5	92.13 <78.35> (2340 <1990>)	207.09 (5260)	226.38 (5750)	232.28 (5900)	151.57 (3850)	106.30 (2700)	144.88 (3680)	234.25 (5950)	153.94 (3910)	52.36 (1330)
ViO55-5	91.34 <77.17> (2320 <1960>)	218.90 (5560)	244.09 (6200)	250.00 (6350)	163.78 (4160)	114.17 (2900)	156.69 (3980)	253.54 (6440)	173.23 (4400)	59.84 (1520)

	K	L	M	N	O	P
ViO45-5	13.78 (350)	76.77 (1950)	25.59 (650)	5.12 (130)	1.57 (40)	R38.39 (R975)
ViO55-5	15.75 (400)	78.35 (1990)	27.56 (700)	5.31 (135)	1.77 (45)	R39.17 (R995)

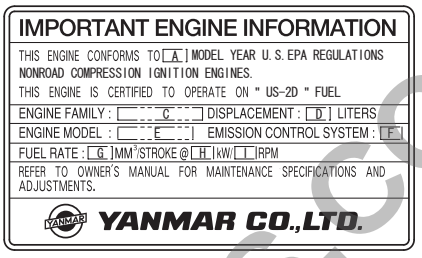
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2) Engine Identification

(1) Emission control labels of US EPA

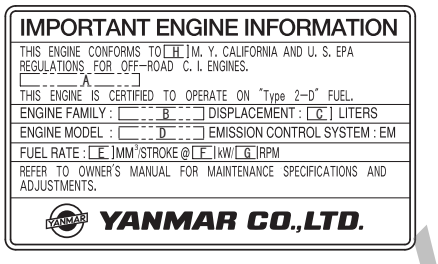


EPA label for constant speed engines

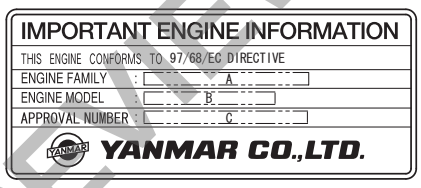


EPA label for variable speed engines

(2) Emission control label for both EPA and ARB



(3) 97/68EC Directive label



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Point 6

Disassemble :

- Install a bolt as a handle in the hole at the end face of the flywheel and remove carefully so as not to damage the ring gear.

  Reassemble : Flywheel mounting bolt T = 61.5 to 65.1 ft•lbf. (83.3 to 88.2 N•m), apply lube oil

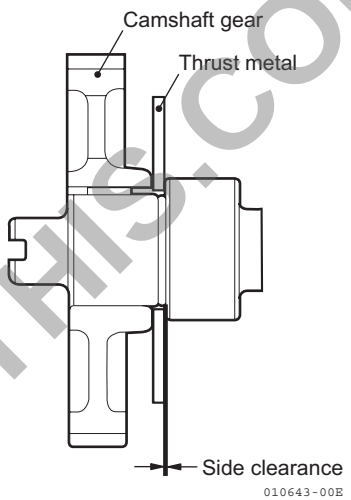
Point 7

Disassemble :

- Measure the camshaft side gap.

in. (mm)

	Standard	Limit
Side gap	0.002 to 0.0079 (0.05 to 0.20)	0.0118 (0.30)



- If the measured side gap exceeds the limit, replace the thrust metal.

Disassemble :

- Since the camshaft gear is shrink-fit, heat it to 356 to 392°F (180 to 200°C) for extraction.
- For camshaft removal, raise the engine with its mounting flange at the bottom. After removing the thrust metal mounting bolt from the camshaft gear hole, extract the camshaft carefully so as not to damage the bearing bushing.
- Rotate the camshaft a few turns before extracting it to prevent the tappet from being caught by the cam.
- After removing the camshaft, set the engine horizontal and fix it on the base.

⚠ CAUTION

Unforeseen injury may arise due to falling of slipping when raising the engine vertically or returning it to the horizontal position. Proceed carefully so as not to lose balance.

Point 8

Reassemble :

- Do not forget to install the oil pan mounting bolts on the bottom side when installing the gear case.
- Apply sealant (code No.977770-01212) and install the gear case by matching the two dowel pins.

Point 9

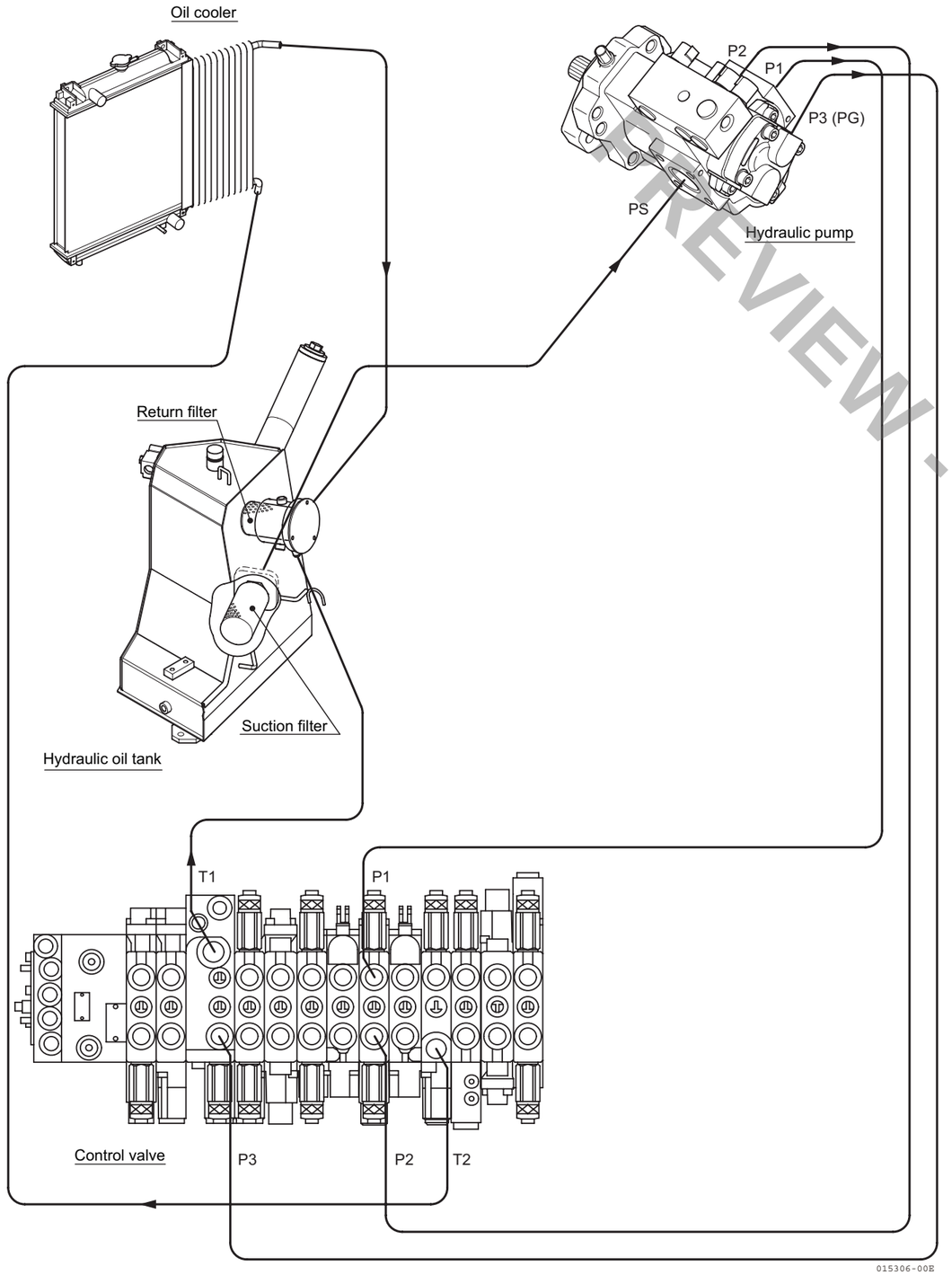
Reassemble :

- Replace the oil seal whenever disassembled.
- Apply lithium grease at the time of assembly.

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5. HYDRAULIC SYSTEM



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CHAPTER 6

HYDRAULIC EQUIPMENT

6-1 Hydraulic Pump 6-1-1
6-2 Control Valve 6-2-1
6-3 Pilot Valve 6-3-1
6-4 Swing Motor 6-4-1
6-5 Travel Motor 6-5-1
6-6 Blade Control Pilot Valve 6-6-1
6-7 Solenoid Valve for P.T.O. Operation 6-7-1
6-8 Pilot Check Valve (For Quick Coupler Circuit) 6-8-1

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2. Operation

1) Unloaded state (Port Pp2 with No Pilot Oil Supplied)

(1) Oil flow discharged from the pump P1

The oil discharged from the hydraulic pump P1 flows into the control valve through the port P1 and flows out directly to the hydraulic oil tank through the spool of the inlet section. At this time, the spool blocks the line to the by-pass passage, so that the pressure does not rise even if the control levers for the right travel, boom, bucket or P.T.O. 2 are operated.

(2) Oil flow discharged from the pump P2

A part of oil discharged from the hydraulic pump P2 flows into the control valve through the port P2 and flows out directly to the hydraulic oil tank through the spool of the inlet section. At this time, the spool blocks the line to the by-pass passage, so that the pressure does not rise even if the left travel control lever or boom swing pedal is operated.

(3) Oil flow discharged from the pump P3

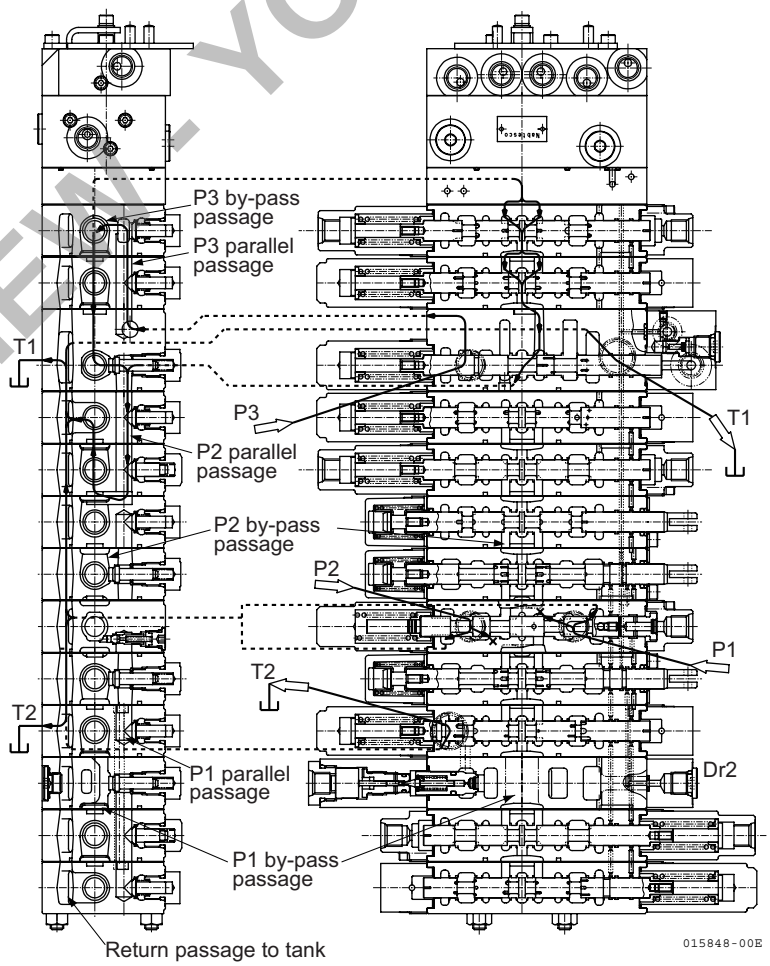
The oil discharged from the hydraulic pump P3 flows into the control valve through the port P3 and flows to the parallel passage of the swing and blade sections.

In the neutral state of the spools, the by-pass passage is not blocked by any spool, so that the oil from the parallel passage flows to the hydraulic oil tank through the by-pass passage of the blade and swing spools, the check valve in the P3 inlet section, the P2 parallel passage, the by-pass passage of the P.T.O. 1 spool and the by-pass passage of the arm section spool.

(4) 2-way valve

When no oil is supplied to the port Pp2, each pilot oil port is led to the return passage to the reservoir in this valve. Refer to "6. 2-way Valve" for more details.

Operation in unload state



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3) Disassembly and Reassembly of Circuit Relief Valves

(1) Disassembly

[1] Lightly hold the body **5** by the hexagonal part of the width across flats **22** with a vice stand.

[2] Remove the locknut **8** with a wrench (19 mm).

[3] Remove the adjust screw **7** with a hexagon bar wrench (4mm).

[4] Remove the spring **9**, the pilot poppet **6** and the spring guide using tweezers or the like.

[5] Remove the plug **4** with a wrench (19 mm), and the other parts can be removed at this time.

[6] Remove the socket **1**, the piston **3**, the spring **10** and the poppet **2** in this order.

(2) Reassembly

[1] Install the spring guide **16** to the adjust screw **7** and install the spring **9**.

[2] Install the pilot poppet **6** into the plug **4** and lightly tighten the adjust screw **7** (with the spring guide **16** and the spring **9** installed). At this time, also tighten the nut M14 **8** lightly.

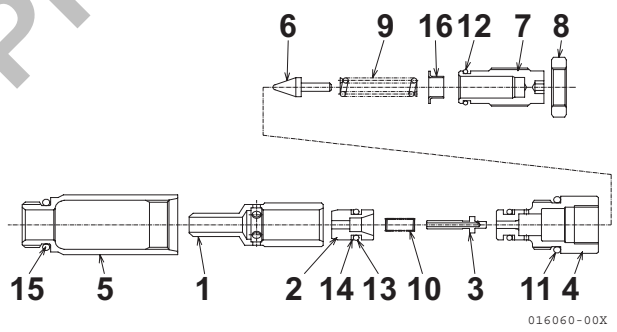
[3] Install the spring **10** and the piston **3** into the poppet **2**, and install them into the socket **1**.

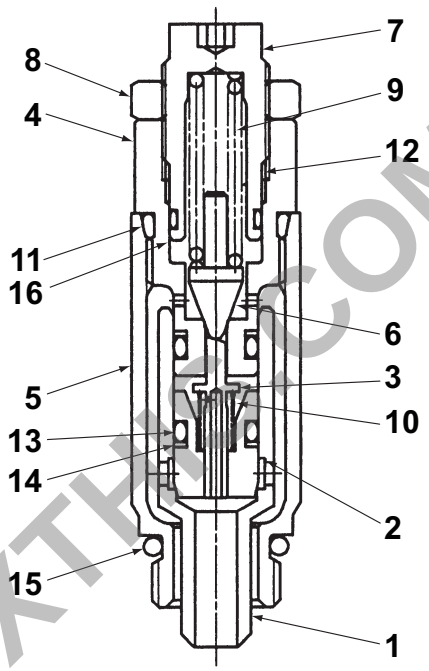
[4] Make sure that the piston **3** is put into the hole in the tip of the plug 4 and screw the plug **4** to the body **5** at the specified torque.

Tightening torque : 43.4 ft·lbf (58.8 N·m)

[5] Adjust the pressure with adjust screw **7** using a hexagon bar wrench (4 mm) and tighten the nut M14 **8** at the specified torque.

Tightening torque : 14.5 ft·lbf (19.6 N·m)





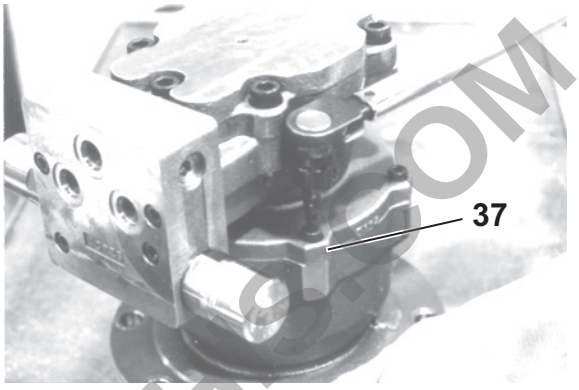
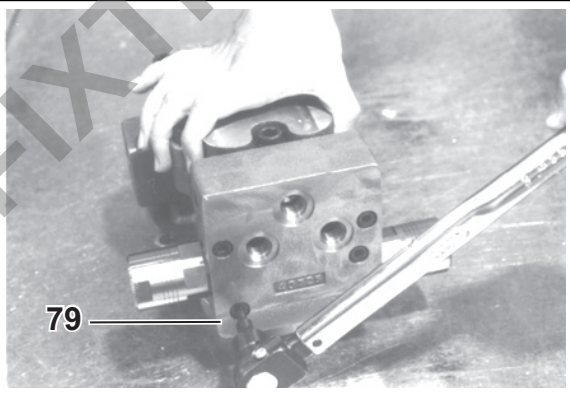
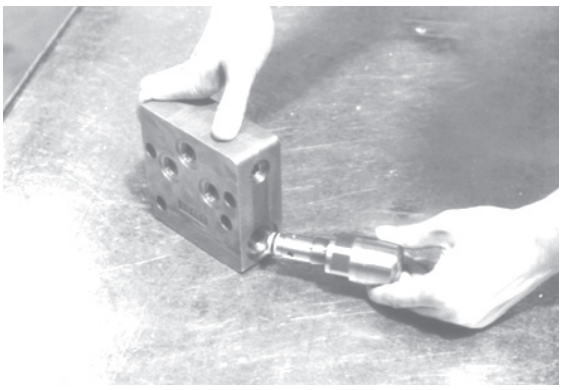
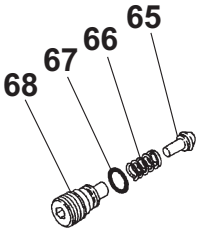
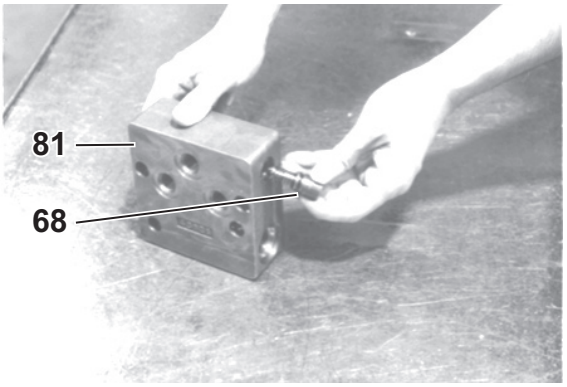
No.	Part
1	Socket
2	Poppet
3	Piston
4	Plug
5	Body
6	Pilot poppet
7	Adjust screw
8	Locknut
9	Spring
10	Spring
11	O-ring 1B P15
12	O-ring 1B S10
13	O-ring 1A P7
14	Backup ring
15	O-ring 1B P14
16	

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4) Disassembly

1. Hydraulic Motor [(1) - (13)]

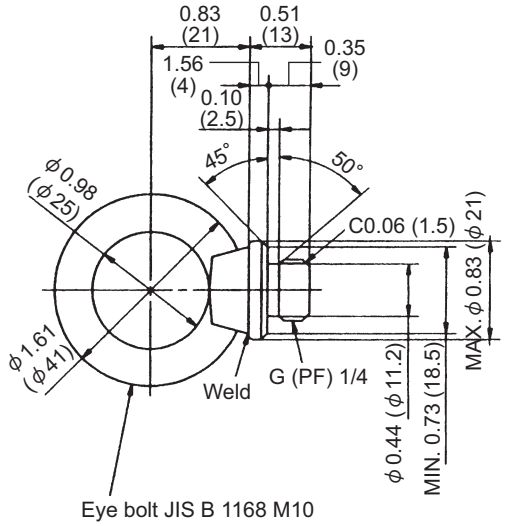
Procedure	
(1) Loosen hexagon socket head bolts **37** to remove hydraulic motor assembly from reduction gear body. Tool : Hexagon bar bit : 0.236 in. (6 mm) ***Notes :*** • *Remove hydraulic motor assembly from reduction gear body with drain port opened.* • *If hydraulic motor assembly cannot be removed from reduction gear body easily, insert screwdriver or the like into mating surfaces of assembly and body to remove it. If there are any fins created by the use of screwdriver, cut away all the fins.*	
(2) Loosen hexagon socket head bolts **79** to remove hydraulic valve assembly.	
(3) Remove relief valve assembly. Tool : Wrench : 1.417 in. (36 mm) ***Note :*** *Do not disassemble relief valve assembly if not required.*	
(4) Remove hexagon socket head plugs **68** to remove O-rings **67**, springs **66** and check valves **65**. Tool : Hexagon bar bit : 0.315 in. (8 mm) 	

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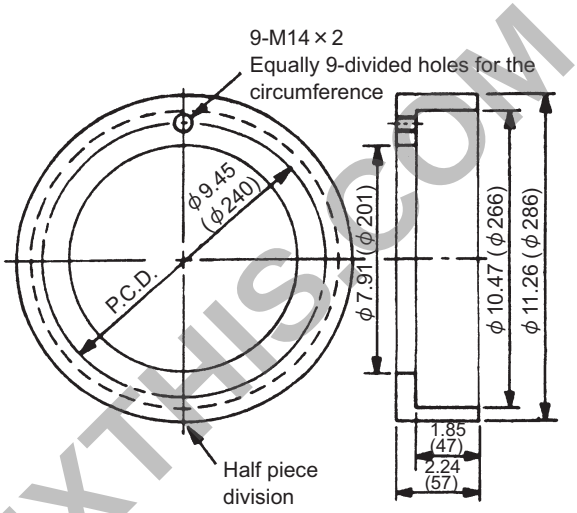
4. Special Tools

Unit : in. (mm)

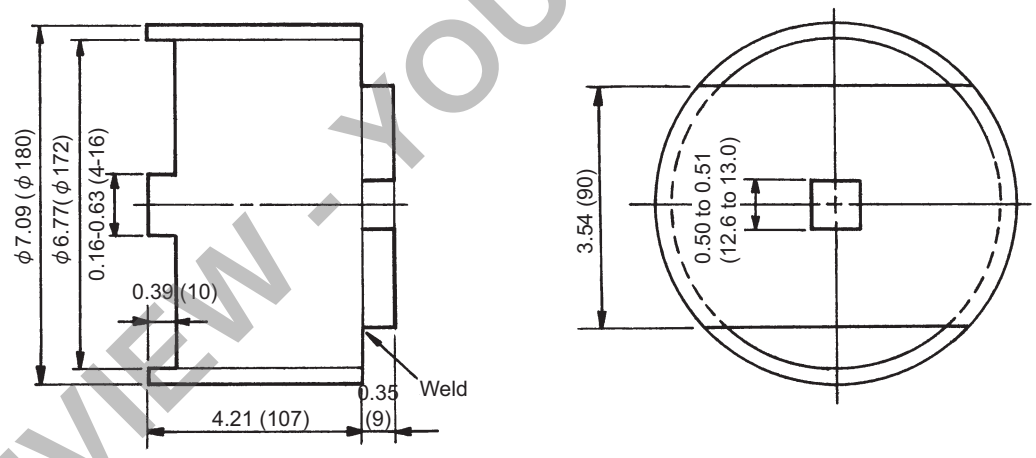
S-1 : Eye bolt



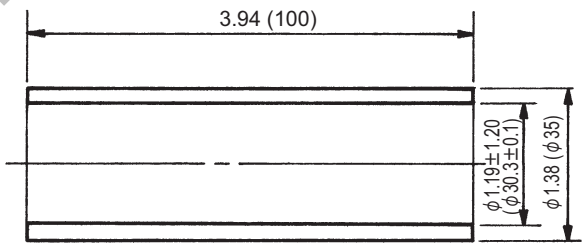
S-2 : Housing disassembly jig



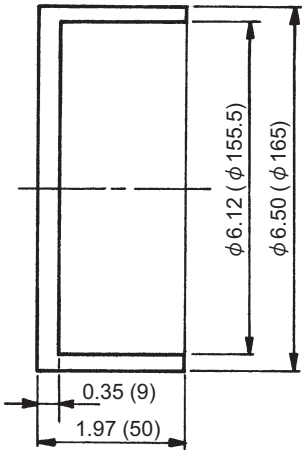
S-3 : Ring nut tightening jig



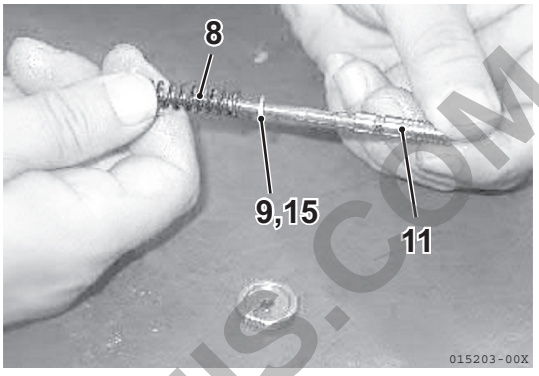
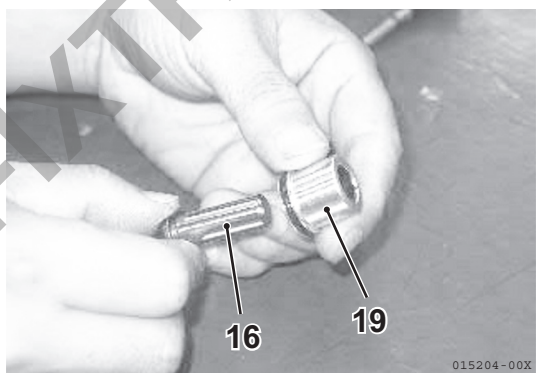
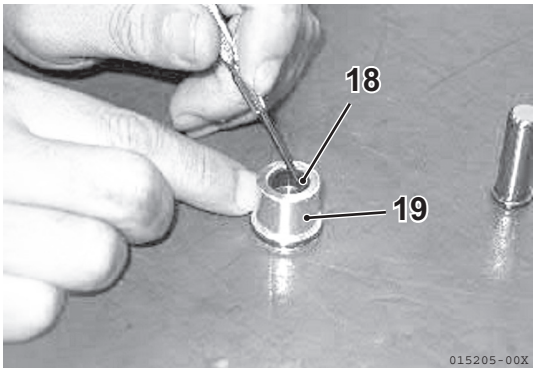
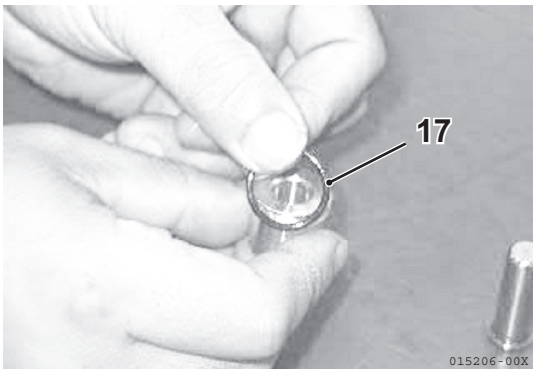
S-4 : Ball bearing disassembly jig



S-5 : Angular bearing press-fitting jig

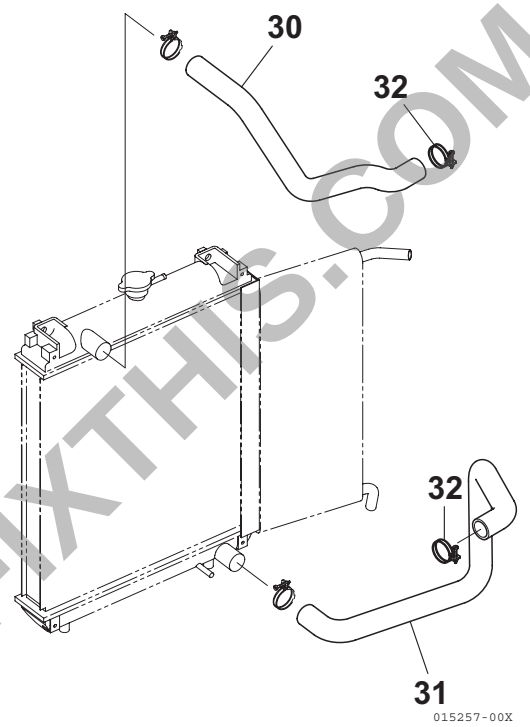
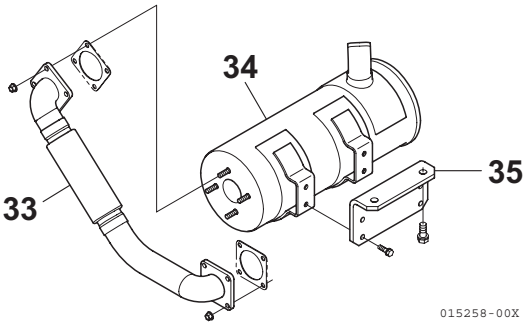
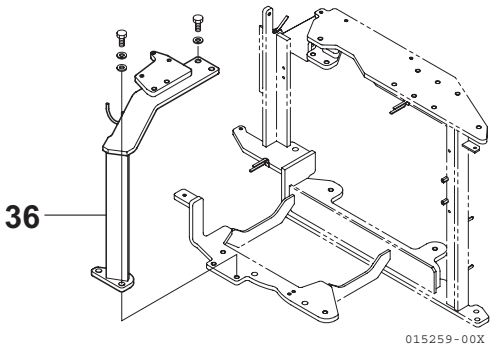


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Procedure	
(13) Separate spool **11**, spring **8**, shim **15** and washer **9**. ***Note :*** • *Always keep pressure reducing valve as assembly.* • *Washer **9** is used for presetting of spring **8**. Its thickness differs assembly by assembly and some may have no washer **9**.*	
(14) Remove push rod **16** from plug **19**.	
(15) Remove gasket **18** from plug **19**. ***Note :*** • *Use appropriate tool to remove gasket **18**.* • *Take care not to damage inner surface of plug **19**.*	
(16) Remove O-ring **17** from plug **19**.	

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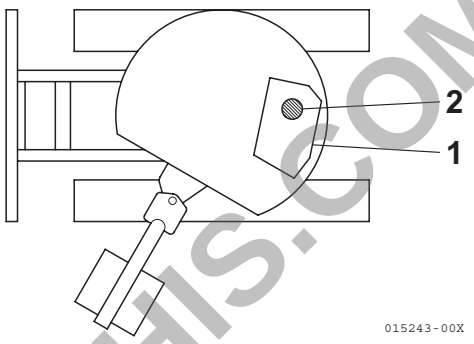
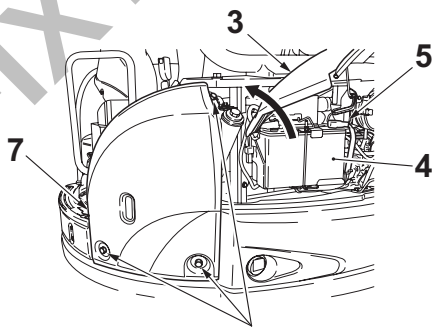
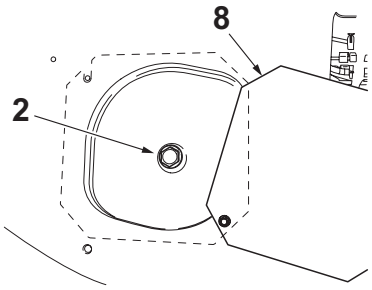
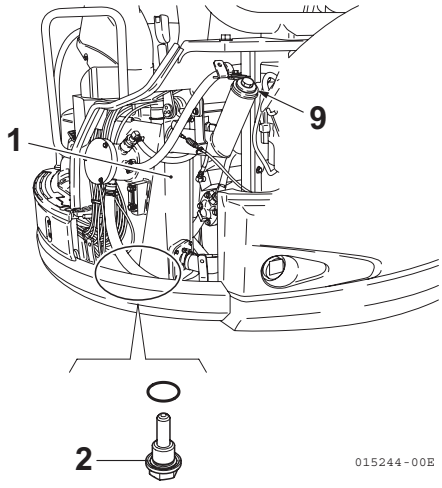
Procedure	
(25) Loosen the two hose clips **32** to disconnect the upper hose **30** and the lower hose **31** from the engine.	
(26) Loosen four nuts to remove exhaust gas tube **33** from the engine. (27) Loosen four cap screws to remove exhaust gas silencer **34** from the engine. (28) Loosen two cap screws to remove the silencer bracket **35**.	
(29) Remove the silencer bracket **36** from the engine mount.	

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7-5-3 Removal and Reinstallation of Swing Motor

1) Removal

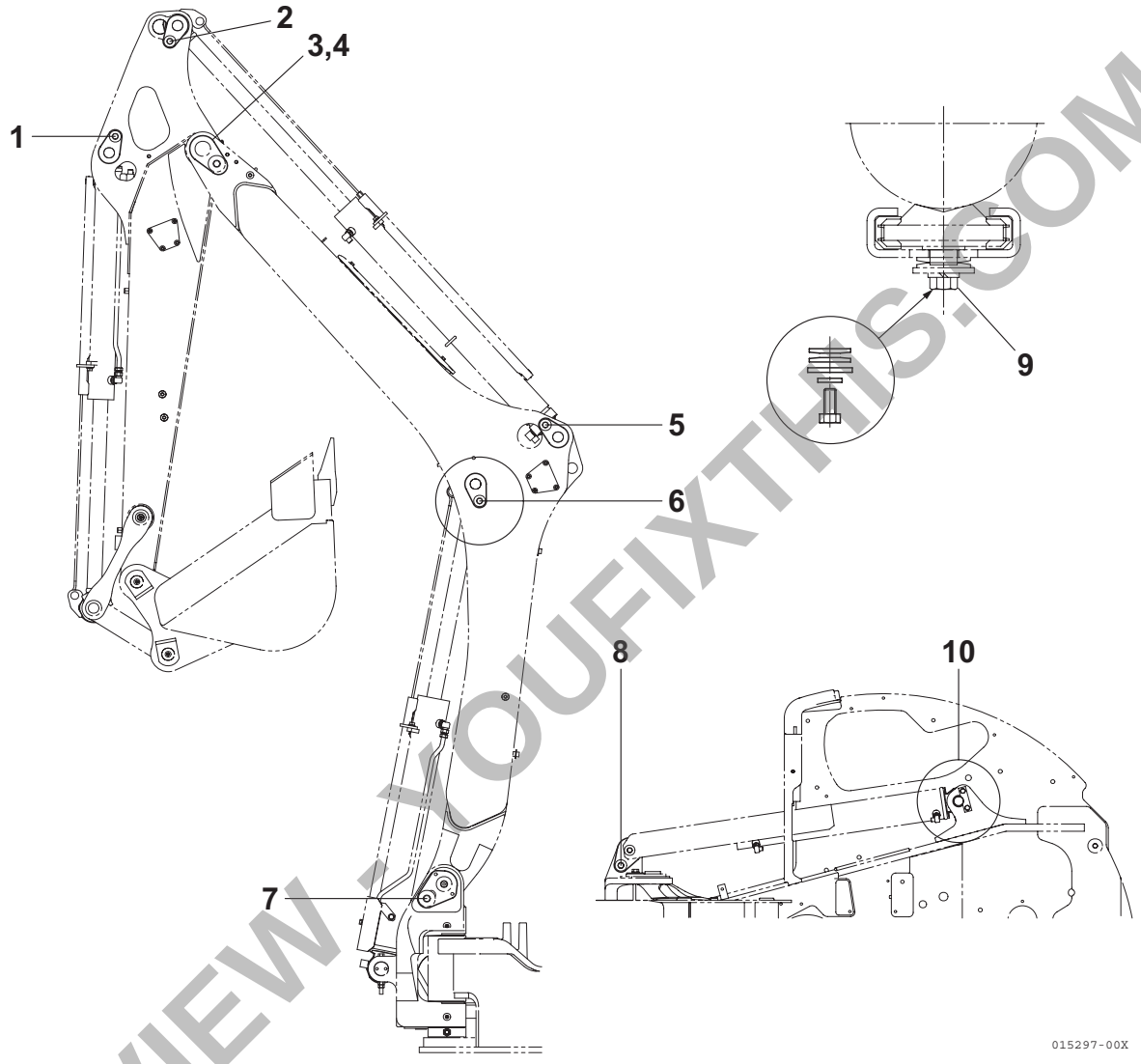
Procedure	
(1) Swing the upperstructure so that the drain plug **2** of hydraulic oil reservoir **1** can position in the middle of the tracks. Then lower the bucket to the ground and stop the engine.	
(2) Open the engine hood rear cover **3** and remove it. (3) Disconnect the battery negative cable **5** from the battery **4**. (4) Loosen three cap screws **6** to remove the side cover **7**. (5) Remove the bottom cover **8** and put an oil container under the drain plug **2** of the hydraulic oil reservoir. (6) Remove the drain plug **2** to drain hydraulic oil. **(Q'ty: 10 Gal(38L))** At this time, loosening or removing the filler cap **9** make oil draining easier. Alternatively, a compression vacuum, which is installed to the breather hose of the hydraulic oil tank, can be used if a stable air pressure (air from a compressor) can be ensured.	  Viewed from under the machine body 

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7) Reinstallation

Reinstall the implement in the reverse order of the removal procedure.



Tightening torque and Adhesive

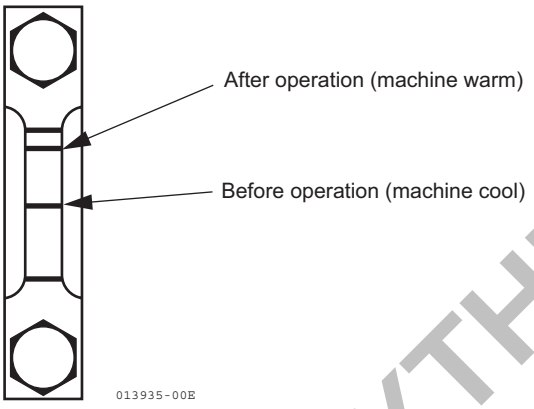
No.	Size	Tightening torque	Adhesive
1	M12	57.9 to 72.3 ft·lbf (78.5 to 98.1 N·m)	Apply Three Bond 1324 or its equivalent
2	M12		
3	M14	86.8 to 108.5 ft·lbf (117.7 to 147.1 N·m)	
4	M12	57.9 to 72.3 ft·lbf (78.5 to 98.1 N·m)	
5	M12		
6	M12		
7	M14	86.8 to 108.5 ft·lbf (117.7 to 147.1 N·m)	
8	M12	57.9 to 72.3 ft·lbf (78.5 to 98.1 N·m)	
9	M10	32.6 to 43.4 ft·lbf (44.1 to 58.8 N·m)	
10	M10		

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10-1-8 Fluctuation in Oil Level of Hydraulic Oil Tank Due to Temperature Change

Phenomenon

The oil level of the hydraulic oil tank varies between before operation (the machine is cool) and after operation (the machine is warm).

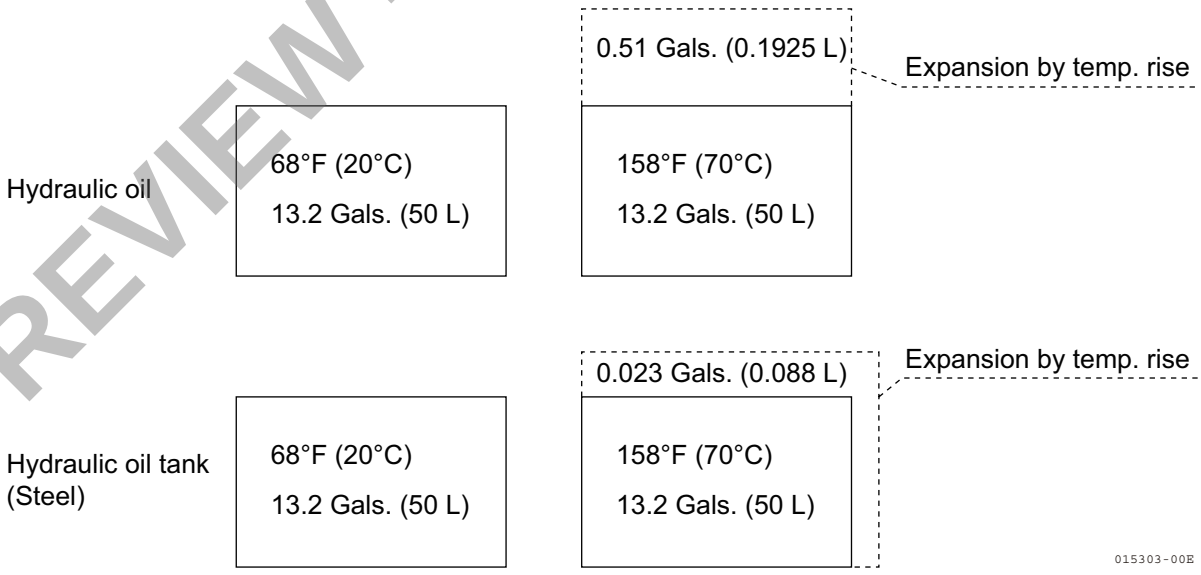


Reason

The oil level changes because the thermal expansion factor of oil is far larger (about 20 times) than that of steel.

1. Liner thermal expansion factor of steel : 11.7×10^{-6}
2. Cubical thermal expansion factor of steel : 3.51×10^{-5}
3. Cubical thermal expansion factor of hydraulic oil : 7.7×10^{-4}

(Example)



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